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What is antibiotic resistance?

Antibiotics are drugs that doctors prescribe to treat infections that are caused by bacteria. The antibiotics are designed to kill or stop the growth of the bacteria that are causing infection. Sometimes bacteria change in a way that an antibiotic that killed them or stopped their growth before cannot do that anymore. The antibiotic is then no longer effective against those bacteria and another, often more powerful, antibiotic has to be used. When this process happens, the new, changed bacteria are called 'antibiotic-resistant' because they are resistant to being killed by, or their growth is not stopped by, the antibiotic.

How is antibiotic resistance spread?

Antibiotic resistance is a result of the misuse and overuse of antibiotics. Antibiotics are often over-prescribed due to demands from patients, time pressure on physicians, and uncertainty about the diagnoses. Using antibiotics when they are not really needed or not taking them for the complete time period prescribed give bacteria an opportunity to adapt and change in a way that makes them resistant to the antibiotics being used.

Use of antibiotics in animals that are raised for food can cause the bacteria that naturally occur in meat from those animals or bacteria that are naturally released by those animals into the environment to be resistant to antibiotics. Bacteria in the environment can get into water that is used on crops or that people drink. People can then get antibiotic-resistant infections by handling or eating undercooked contaminated meat or crops, or drinking contaminated water.

Resistant bacteria are also spread from person to person in the community or in healthcare facilities, often by the bacteria being on someone's hands and being transferred from one person to another by touching with hands.

How can antibiotic resistance be prevented?

Many illnesses, such as the common cold and the flu, are caused by viruses. Antibiotics are not effective against viruses. Patients should not expect their healthcare providers to prescribe an antibiotic for illnesses caused by viruses. Treatment that helps relieve symptoms might be the best option for those types of illnesses.

Healthcare providers should prescribe an antibiotic only when it is needed. Patients who get an antibiotic should take it exactly as the prescription says. Some general rules to follow are: 1) Take all of the medication at the times and within the timeframe prescribed, even if the symptoms go away; 2) Do not save some of the antibiotic for the next time you get sick; and 3) Do not take an antibiotic that is prescribed for someone else.

Because antibiotic-resistant bacteria can be passed between people on the hands, regular and thorough hand washing with soap and water is a good practice to follow to prevent the spread of antibiotic-resistant infections. Also, because foods and water can be contaminated with antibiotic-

resistant bacteria, be sure to handle foods carefully, cook foods properly, wash hands after handling food, and drink water from safe sources.

What are the consequences of antibiotic resistance?

Antibiotic resistance is a serious public health threat. Many bacteria that cause serious infections in the United States and worldwide are developing resistance to antibiotics. When bacteria become resistant to an antibiotic, it can be hard to find another antibiotic to treat infections. Over time, even a new antibiotic that is used can become less effective, more toxic, and more expensive, and there is a risk that bacteria could become resistant to them, too, leaving few options for the treatment of serious infections. Bacteria that are resistant to several types of antibiotics are called multidrug-resistant organisms (e.g., methicillin-resistant *Staphylococcus aureus* or MRSA (<https://www.vdh.virginia.gov/epidemiology/epidemiology-fact-sheets/methicillin-resistant-staphylococcus-aureus-mrsa/>)). People who develop infections from bacteria that are resistant to antibiotics have increased risk of hospitalization and transfer to an intensive care unit, higher hospital costs, longer length of stay in the hospital, and higher risk of death.

In addition, it is important to not overuse antibiotics. Overuse can eliminate “good” bacteria from the body, increasing the risk for developing severe diarrhea caused by *Clostridium difficile* (<https://www.vdh.virginia.gov/epidemiology/epidemiology-fact-sheets/clostridium-difficile-c-difficile/>).

How can I learn more about antibiotic resistance?

- If you have concerns about antibiotic resistance, contact your healthcare provider.
- Call your local health department. A directory of local health departments is located at the [VDH Local Health Districts page](#).
- Visit the Centers for Disease Control and Prevention website at [the CDC's page on antimicrobial resistance](#).

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